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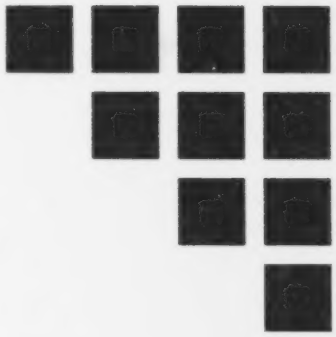


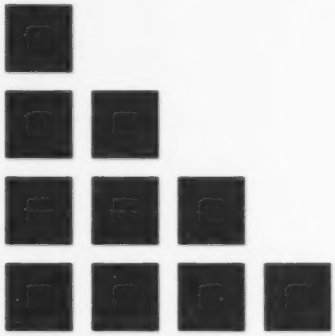
Food Insecurity in Canada, 1998-1999

R-01-2E

by
Bruno Rainville and Satya Brink

May 2001

Research Paper



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Abstract

Insecurity due to the anxiety from not having enough money to purchase food is a significant social issue that seems to persist in food-rich countries such as Canada and is seen as an extreme manifestion of personal and household insecurity. This situation has serious consequences on life experiences and indicates mutiple economic, health and social disadvantages. Such implications provided the impetus for this study. The objectives of this study were to estimate the proportion of the food-insecure population in Canada, to verify if those who lacked food security were a homogeneous group, to identify the policy-sensitive factors that can be targeted in order to prevent and support food-insecure households, to identify the main food acquisition problems faced by food-insecure households and the coping strategies they used, and to determine how many children lived in households that have experienced food insecurity.

The microdata from the National Population Health Survey and the Food Insecurity Supplement of 1998-1999 were used in this study. A household was food insecure if the respondent or anyone in the household experienced at least one of the following situations in the past year because of a lack of money: (1) worry that there would not be enough food to eat, (2) not eating the quality or the variety of foods that they wanted, (3) not having enough food to eat.

In 1998-1999, though the proportion who lived in a food-insecure household where they did not have enough to eat was about four per cent, approximately ten per cent of the Canadian population and thirteen per cent of children had lived in a food-insecure household in the past year. Most of such households were anxious about not having enough food to eat or not eating the quality or the variety of foods they wanted at least once in the past year. The reasons for experiencing such episodes of food insecurity were varied and not always related to low income. Logistic regression analyses indicated that the factors that increased the likelihood of food insecurity were low household income, member of a young family with children (particularly a lone-parent family), activity limitations, tenants and aboriginal persons living off-reserve. Not all low-income households were food insecure, but when they were, the main source of income was irrelevant. In fact, many of these households were the "working poor," who may not be eligible for income support. Problems of acquiring food often recur at the end of each month. The use of coping strategies increased with the severity of food-insecurity; food-insecure households tended to make their income dollar go further rather than use charitable sources of food.

Public policy in Canada to address this problem relies on income-support programs. Emergency food aid is traditionally provided by the voluntary or charitable sector. Successful policies should provide quick emergency help without high transaction effort or administrative restrictions, sufficient and frequent income-support payments and support that allows households to use mainstream sources of food. It is also important to consider assistance to households that have additional problems acquiring and preparing food.

Acknowledgements

The authors would like to thank all the people who reviewed this research paper and the research framework on the lack of food security. They would also like to acknowledge the collaboration of Statistics Canada in collecting the microdata on food insecurity and including questions on lack of food insecurity as part of a supplement to the National Population Health Survey of 1998-1999.

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1. Introduction

The Applied Research Branch of Human Resources Development Canada has undertaken a number of studies on the implications of insecurity, such as job insecurity and income insecurity. This study of insecurity due to the lack of food is part of this work. Depending on their mandates, other departments may study issues related to food. For instance, Health Canada may study hunger and health consequences, and Agriculture Canada may study the distribution of food stocks. While larger contextual issues such as the national and local food security, rights to food, commodification of food, market failure in the provision of nutrition, community and institutional food infrastructure, changes in culinary culture are not specifically considered, they are recognized as contextual factors.

The term food insecurity is often used as a synonym for hunger and the implications of the insecurity arising from the lack of food has not been well studied. Many studies have addressed the prevalence of hunger and its pernicious consequences to children and families. This study, in contrast, is about insecurity – regarding food insecurity as an extreme manifestation of personal and household insecurity.

1.1 Old problems in new contexts

The distinguishing characteristic of first world countries is growing prosperity widely shared among its population, as evidenced by good housing, health, education and prospects for individuals. In the post-war years, these countries strove to guarantee a basic standard of food, shelter, and income through economic and social welfare policies; and, by the sixties and seventies, much headway had been made in eliminating poverty. However, the affluent industrialized countries are currently undergoing transformation due to major shifts to globalized economies based on information which affected the economic conditions for their citizens. Government spending was curtailed in order to reduce public debt and to control social expenditures. While economic conditions have rebounded in recent years, significant social issues such as homelessness and lack of food have re-appeared. These problems are particularly vexing for countries such as Canada, which have sufficient food and housing stocks.

What are the causes for households to be insecure due to lack of food in the new context? Do food insecure households arrive at this impasse through the same paths? Old assumptions

regarding the reasons for lack food security continue to persist. The problem of lack of food tends to be oversimplified as poor income management, either in terms of acquiring income or in budgeting resources, and are, therefore, generally addressed by income security programs, with mixed success. Many middle class solutions of prudence, such as co-operative gardening, are recommended though inappropriate. (For a more detailed discussion about a literature review and the issues related to food insecurity, see Brink, 2001). Some solutions target those who lack food, rather than those who worry about the lack of food and therefore are not preventive. There is no existing public infrastructure for food distribution to those who lack food, however, community assistance programs, such as food banks are well institutionalized in Canada and are growing in number. Food banks serve those with acute problems and while they provide an essential service, it may be questioned whether they are the most effective and lasting way to address the problem. There are some indications that a series of unsuccessful responses to changes in context results in a chain of difficulties leading to episodes of food insecurity (Tarasuk, 2001). The social and psychological aspects of food insecurity have been noted (Kramer, LeBlanc and McMurry, 1998). Decision making under conditions of insecurity may not be optimal and households may eventually experience of hunger when problems have a cumulative impact.

A key reason for examining the various experiences of those not food secure, is to identify those vulnerable and at-risk populations for the development of adequate preventive and supportive policy measures. Therefore, it is important to include those who are food insecure as well as those who actually experience the lack of food. There are some indications that those who are anxious about the lack of food may be a heterogeneous group requiring a variety of policy measures. The association of poverty has been well documented and many researchers have noted that households relying on government transfers are not protected from food insecurity. Economic security that is essential for food security, is complex requiring adequacy, stability and reliable flow of income (Kramer, LeBlanc and McMurry, 1998). The justifiable focus on poverty has eclipsed other associated or independent factors related to food insecurity such as physical disability or poor health (Blumberg et al., 1999). Food insecurity among the elderly was found to be more complicated than simply lack of access, because of the inability to prepare and eat food available due to functional impairments (Frongillo, 2001). Riches (1996) has identified

the importance of "non-food" factors and warns against the use of indirect measures (such as the use of food banks) alone to determine food insecurity.

Regardless of the pathway to this situation, continuous lack of food security results in a combination of disadvantage in terms of income, health, employability and expectations which characterize extreme forms of poverty rather than just the lack of income. When households are obliged to obtain food in ways that are not socially acceptable, they experience social exclusion as well (Radimer et al., 1992; Lang, 1997). It is essential to develop a realistic understanding of the lack of food security, and the potential of levers available for government and non-government action.

1.2 Consequences of insecurity from lack of food in "food rich" countries

A sense of security is experienced when people have a wide range of options, most of which are desirable, at their potential disposal and when they have confidence that they can exercise them. Insecurity is accompanied by a narrowing of the range of options, most of which are undesirable, and the uncertainty that they can exercise them. It has been pointed out, that food economies are exercised by people of all incomes, however, the poor have less choice in the duration, the type, the content and the responses to the need for food economies. Whether one is secure or insecure results in various behavioural consequences (See Table 1.1). If secure, people are able to focus their efforts on desired goals other than survival, to take risks when seizing opportunities, to create an orientation towards the future and to develop economic, social and human capital. Insecure people cannot. When nutrition is compromised, not only is a consequence current low energy and productivity but also the future risk for the development of children. Knowing the consequences of the lack of food, and previous experiences of it may heighten anxieties. The clustering of factors of disadvantage may affect the next generation as well.

Table 1.1 **Consequences of food insecurity for individuals and households**

Food Secure	Food insecure
Focus efforts on desired goals	Focus efforts on survival, could be time poor
Seize opportunities, take risks	Lack of resilience, no fall back
Future orientation	Live from moment to moment
Develop social and human capital	Have difficulty investing in themselves
Ability to develop support system	Poorer social network
Adequate earned income	Working poor, unemployment
Generally good health	Disability, chronic conditions

1.3 Definition of lack of food security

Because the term food insecurity is used in many contexts, it is wise to begin by specifying what food insecurity is so that it is possible to identify those that have failed to achieve it. Food security implies the certainty or confidence that there will be sufficient food in the foreseeable future. Kendall et al. (1995) suggest that there are quantitative, qualitative, social and psychological components to food insecurity. The elements involved in food security appear to include: the means and the ability to acquire food, the consumption of good quality food in sufficient quantity and the achievement of nutrition goals. While these elements are common to developing countries as well, the differentiating point is to accomplish these elements in the current Canadian context in a manner that meets community standards for respectability (without resorting to emergency or charitable food sources or scavenging) and fairness (without eliminating other options for medical care, transportation, etc., necessary to function in modern societies).

Food security has been defined as "Access by all people at all times to enough food for an active and healthy life. Food security includes at a minimum a) the ready availability of nutritionally adequate and safe foods, and b) an assured ability to acquire acceptable foods in socially acceptable ways" (Anderson, 1990). A Canadian definition is similar. "People have food security when they can get enough food to eat that is safe, that they like to eat and that helps them to be healthy. They must be able to get this food in ways that make them feel good about themselves and their families."(Ontario Public Health Association, 1995).

Those who lack food security, as expected, are defined as failing to achieve this goal. This is demonstrated in the following two American definitions. Lack of food security is: "The inability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways or the uncertainty that one will be able to do so" (Radimer, et al., 1992) and "Food insecurity exists whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain."(Anderson, 1990). A Canadian definition reflects the same issues: Food insecurity is the "inability to obtain sufficient, nutritious, personally acceptable food through normal food channels or the uncertainty that one will be able to do so." (Davis and Tarasuk, 1994).

1.4 Conceptual framework for this study

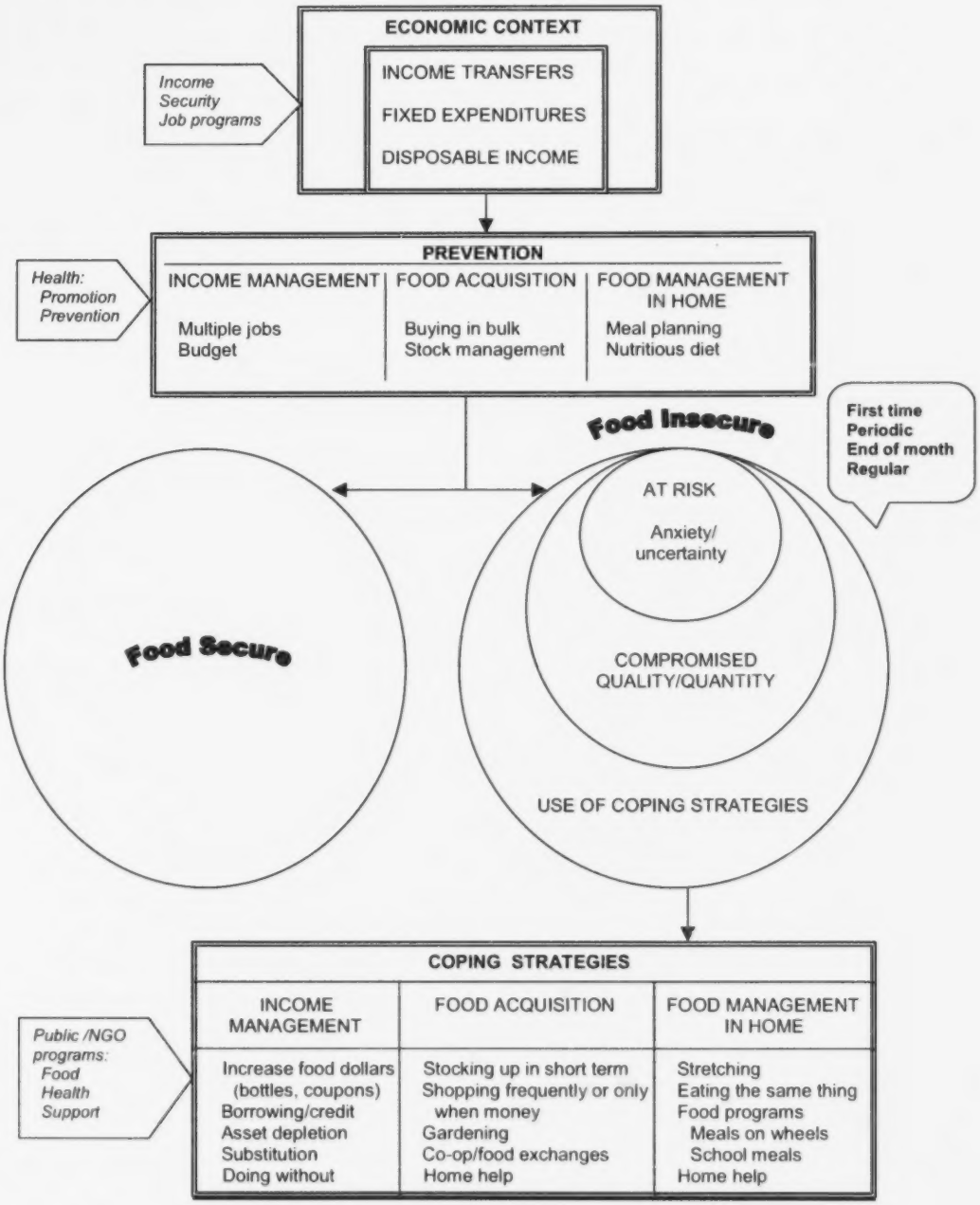
A conceptual framework (Figure 1.1) was developed for the study of insecurity due to the lack of food, based on an annotated bibliography (Brink, 2001). Food insecurity was described as an experience and a process, comprising of a sequence of events, where the household manages the nature and extent of compromise at each event in the sequence. The managed aspect of food insecurity means that each household will experience different components of food insecurity at different times and to different degrees (Tarasuk, 2001). The importance of both quantity and quality of food, particularly the nutritionally adequacy have been stressed by researchers (Kendall et al., 1995). Monthly fluctuation with reduced intake was noted by Wilde and Ranney (1998). The experience of food insecurity may be episodic and may involve a pathway of progressive severity rather than a dichotomy between being food secure and insecure (Wolfe et al., 1998).

In this framework (Brink, 2001), those that are food secure are separated from those that lack food security. Those that lack food security, (1) experience uncertainty that they will be able to acquire and consume adequate quality and quantity of food in mainstream ways (2) consume nutritionally inadequate food (3) consume reduced quantity and quality of food (4) acquire and consume food in non-mainstream (socially unacceptable) ways or by incurring further disadvantage (deplete assets, not spending on necessary medications, etc.)

Lack of food security may be affected by social, legal, institutional or infrastructure factors and these are included in the context (See framework diagram). However, economic factors are given prominence. For instance, low, irregular, or failed streams of income may result from interrupted employment, non-standard jobs, or no job at all. In addition, income may be reduced or lost due to loss of an earning member of the family due to ill health, death or divorce. Persistent low income is associated with poor health and disability which may affect access to food. There are also some indications that the system, or infrastructure, disadvantages those below a certain level of income. For example, persons with low income may unable to shop around for low food prices if they do not operate a car, or if they cannot pay transportation costs. Researchers have noted that community characteristics are important intervening variables in the experience of food insecurity (Olson, et al., 1996). Others have noted a change in the practice of food

consumption with a preference for prepared or processed foods that has resulted in people being inexperienced in preparing food, though "raw" food is cheaper.

Figure 1.1 **Food insecurity framework**



Since socially accepted sources of food are provided by the market, income is a critical variable. Indeed, some researchers argue that all barriers to food sufficiency can be reduced to income. The sources of income and their reliability for a steady flow and reliable amounts are important to individuals and households. To maintain a level of income necessary to raise families with a good quality of life, households have increased the number of earners or worked extra hours. As real average income has been in decline, in the nineties, for the first time, census data picked up households that have two earners with more than two jobs as families seek to increase their income. The process of budgeting and planning is a key process for managing income in times of economic turbulence and labour market churning. For those with low income or irregular income, the planning horizon is short and money for contingencies may cut deeply into disposable income.

Though disposable income is the key, the flexibility afforded after fixed expenditures is important at low incomes. The lack of food security may be periodic, such as during periods of unemployment, spells of illness or during the winter. For instance, those with fixed incomes such as the elderly have noted that their income is insufficient in the winter months when they have higher heating costs. For those with low incomes or high fixed costs, it may be experienced at the end of the month. Since much of the fixed expenditures such as rent are paid at the beginning of the month, they are faced with a phenomenon that is called "too much month at the end of the money." Episodes of food insecurity may also be experienced because of unplanned essential expenditures that deplete income.

The experience of food insecurity is a sequence of events, where the household manages the nature and extent of compromise at each event in the sequence. Quality can be traded off for quantity, for example. The experience tends not to be static but dynamic, defined by temporal sequence of events and experiences that can be described in terms of frequency, duration and periodicity (Tarasuk, 2001). These characteristics are included in the framework. The literature describes three negative food states experienced by people who are not food secure which are included in the framework. *Food insecurity* is the anxiety arising from the limited or uncertain ability to obtain and consume sufficient quantity of nutritionally adequate food through normal food channels. When food insecure households begin to reduce their intake or to reduce the quality of their diet, they are *nutritionally insecure* because their food is nutritionally inadequate

(Radimer et al., 1992). However, it should be noted that food security is a necessary but insufficient condition for nutrition security. Nutrition security may be adversely affected by food choices that are made, due to factors other (lack of information, poor food habits, dieting, etc.) than income. *Food poverty* is the inability to obtain and consume sufficient quantity of nutritionally adequate food. Note that most studies of food insecurity focus on the food poor. These three levels are not discrete and they tend to be cumulative. In other words, the food poor also experience the anxiety of food insecurity. There can be movement between the three states. Those who are food insecure, may begin coping strategies for fear of running out of food. For instance, a family may experience all three levels in a month, worrying about a shortage of food and money, compromising quantity and quality of food to delay a crisis and, if money and food run out, absolute deprivation at the end of the month, until the cycle begins again.

The severity of the problem is a function of both the level to which food intake (quantitative and qualitative) is compromised and the duration of the deprivation. The distinctions are useful for developing a package of policies that target all three levels. While all three food states are problematic, the intensity of the impacts vary with the severity and duration of the time spent in each state. Up to one fifth of food bank users are first time users, so for many this may be a new experience. They may not have developed ways to cope with the situation. Weight loss, on the other hand, would result only if persons experience food poverty for a period of time. Income security programs may not be serving this group adequately.

The consequences of the lack of food security are behavioural decisions with long term results. Households that are food insecure tend to spend more time and effort to obtain food for their members, in contrast to the current trend for households to reduce effort through intake of purchased prepared foods or restaurant meals. So the shortfall is not only of disposable income but also of disposable time. Those with compromised diets begin to experience problems of low energy, deficiencies, anxiety and even hunger if meals are skipped over a long period. The impacts of food poverty range from affected development for children, difficulty in learning for students, and low productivity for adults.

Within poor families, access to food can be transferred between members. For instance, in many households of traditional culture, males may be fed first and followed by females but there may

not be enough food for all. Mothers may feed children by reducing their own intake. This type of sharing has negative consequences of varying degrees for the members of the family.

As shown in the framework, those that are food secure have many options and most of these options are mainstream and desirable. Those who are not food secure, on the other hand, have fewer options and most of them are less desirable and often not mainstream strategies. These options can be grouped under three behaviour categories: income management, food acquisition and food management in the home. Since lack of food security is the issue under study, the less desirable options are considered.

*1.4.1 **Income management***: Income management involves ensuring the flow of income and expenditures in a manner that ensures the well-being of the household. The process is harder for low income households that have less disposable income and hard choices between necessary expenditures. They may have difficulties even with foreseen expenditures and unexpected expenditures can upset the budget over long periods.

First time food insecure households may have options that are not available to those with a persistent problem of food security. They may borrow hoping that the crisis will pass, or they may start to deplete assets, ranging from borrowing from mainstream credit institutions against the security of a house or car, or from other institutions such as pawnshops which accept other durables as security. Even informal borrowing may be difficult because most poor people, tend to know people like themselves who do not have much income. But credit is not a viable option for those in constant food insecurity since they have depleted their assets and have little ability to pay back loans. It makes it impossible for them to make ends meet in the months when the debt is repaid. Some are able to manage small shortfalls by either the use of coupons or returning bottles and cans to increase food dollars or by substituting regular expenditures, such as avoiding transportation or drug expenditures in favour of food. A key issue is forced substitution, where the inability to deal with unexpected expenditures, to increase income or to deal with variations in expenditures (heating costs in winter) results in reduction in expenditures for essentials such as food or heat. If recipients of social assistance are using money allocated to food for housing or other needs, the calculations for social assistance payments may require revisiting. It may also be worthwhile providing a larger margin to allow households some economic flexibility, in exchange for reduced public expenditures in the long run.

It is possible that below a certain level of income, middle class solutions no longer hold. For example, gardening to reduce costs for fresh produce, is not attractive to households who may live in rooms or apartments without land, who may be stressed for time, and who are not sure that they can pay the rent long enough to reap the fruits of their labour.

*1.4.2 **Food acquisition***: Food acquisition activities can make a difference to food security. Food staples may be bought in large quantities. Other food products can be bought in bulk to reduce costs while shopping more frequently for fresh foods with short storage times. With good stock management additional flexibility is gained for composing meals for both quality and variety. When income is irregular or low, households may have fewer options. They may shop daily to eke out money for food or they may be forced to rely on options that are less desirable such as using a food bank. Programs such as home care for elderly and disabled people may assist them with the purchase of food if they are unable to shop themselves.

The key barriers to food acquisition are poor health, disabilities, transportation costs, limited choice of shopping possibilities, inability to stock up or buy in bulk or store food. Some variables interact, too. The lack of transportation limits the geographic shopping range and bulk buying, particularly when food must be carried back. Elderly and disabled persons encounter difficulties shopping, particularly in winter. These factors, in addition to a shortage of money, may require frequent shopping trips with small packages; which, may be more expensive than large ones.

*1.4.3 **Food management***: Food management at home requires the proper storage of food, judicious meal planning and monitoring for nutritious content. Lack of adequate food storage can result in spoilage, and waste particularly for foods with a short shelf life. Where time is an issue, the quality of foods may be sacrificed.

Positive options include meal planning to ensure the use of inexpensive foods, using ingredients on hand and foods in season. Negative options include stretching food components by reducing quality and eating the same thing over and over again. For some, it may also be possible to rely on programs such as meals on wheels and school meals. Food may be prepared for some elderly and disabled persons by home care workers.

The choices of coping strategies could vary with the type of households, the degree of income short fall, or the community of residence. The number of coping strategies is likely to be related to whether households are food insecure, nutritionally insecure or food poor.

1.5 Research questions

There were five research questions:

1. What was the proportion of people in Canada who lack food security?

   The number of people living in households that have experienced an episode of food insecurity would indicate the degree of effort required for prevention.

2. Were the people who lacked food security a homogeneous group?

   If food insecurity is concentrated in groups with similar characteristics, policy strategies would be more straight forward than if they were heterogeneous when more diverse approaches would be required.

3. What were the policy sensitive factors that can be targeted in order to prevent food insecurity and to support food insecure households?

   Prevention policies may need to be available when there are indications of future difficulty rather than the presence of food insecurity. Policies may be more costly and difficult once the household experiences severe food poverty.

4. What were the main food acquisition problems faced by food insecure households and what were the coping strategies they used?

   While crises may be addressed by having access to sources of emergency food such as food banks, cyclical food insecurity requires an adequate as well as a more time-sensitive policy response.

5. How many children lived in households that have experienced an episode of food insecurity?

   It is crucial to know if children are shielded from food insecurity by adults in the household, and if adults compromise their own intakes first in order to minimize the impact of food poverty on children.

2. Methodology

2.1 Data

Human Resources Development Canada (HRDC) collaborated with Statistics Canada to add a supplement to the third cycle of the National Population Health Survey (NPHS) of 1989-1999. This Food Insecurity Supplement (FIS) was based on the research framework developed through extensive consultation. The FIS provides detailed information collected from people who were screened in, through questions about food insecurity on a nationally representative survey. The data in the third cycle (1998-1999) of NPHS and the FIS were used for this research paper.

2.1.1 The National Population Health Survey

The NPHS is a national longitudinal survey which began in 1994-1995 and was conducted every two years thereafter. The periodic cross-sectional and longitudinal data were intended to enable the study of the determinants of good health. Data from cycle three used in this study includes households from all provinces[1] (with the exclusion of populations on Indian Reserves, Canadian Forces Bases, Yukon and Northwest Territories). Information was collected from a single household member but includes information from others in the household. The questionnaire included questions related to health status, use of health services, determinants of health and a range of demographic and economic information. There were 16,787 respondents in the survey for a weighted total of approximately 29,500,000 individuals in Canada.

Those responding positively to the screening questions included in the NPHS 1998-1999 were contacted for the Food Insecurity Supplement. Food insecure households were identified when a household respondent answered positively to at least one of the following screening questions:

In the past 12 months, did you or anyone in the household:

Q1 … worry that there would not be enough to eat because of a lack of money?

Q2 … not eat the quality or variety of foods that you wanted because of a lack of money?

Q3 … not have enough food to eat because of a lack of money?

[1] In all provinces except Quebec, the NPHS sample was drawn using the Labour Force Survey frame and design. In Quebec, the NPHS sample was based on households who participated in the Enquête sociale et de santé (ESS).

Overall, there were 1,265 food insecure respondents who answered the supplement and who agreed to share their information with HRDC. They represented a weighted total of approximately three million people in Canada.

2.1.2 Food Insecurity Supplement

The supplement was used to collect data from the food insecure households identified in the NPHS, 1998-1999. It provided national data on the characteristics of Canadians who are not food secure and facilitated analysis of how such insecurity affects families in Canada. The questions covered the problems people have shopping for food; the actions people take to stretch food money; the problems people have feeding their families; and problems with competing essential expenditures such as food and housing. Many FIS questions or items were developed to capture the frequency and the periodicity of the underlying problems associated with the lack of food security.

2.2 Concepts measured

A respondent lived in a food insecure household if he or anyone in the household worried about having enough food, consumed reduced quantities or quality of food or had insufficient food. Based on the responses to the three screening questions of the NPHS, the respondents who lived in a food insecure households were categorized into three groups by their level of food insecurity: food anxiety, compromised diet and food poverty, using the following protocol (Table 2.1).

Table 2.1 **Severity of food insecurity**

Food anxiety		Compromised diet		Food poverty	
Q1	Yes	Q1	Yes/No	Q1	Yes/No
Q2	No	Q2	Yes	Q2	Yes/No
Q3	No	Q3	No	Q3	Yes

These levels represent the severity of the food insecurity in the household – *food anxiety* being the least severe and *food poverty* being the most severe. In this study, the term "food insecure household" represents a respondent who lived in a food insecure household experiencing any or all of the three levels.

2.3 Methods

The following analyses were planned to respond to the research questions:

1. What was the proportion of people in Canada who lack food security?

   Using data from the NPHS, weighted cross-tabulations were done to estimate the proportion of canadians (adults and children) who lived in a food insecure household and to categorize the households by severity, keeping in mind that the categories may be cumulative.

2. Were the people who lacked food security a homogeneous group?

   The demographic, health, household, geographic and economic characteristics[2] of the food-insecure households were described (weighted proportions) to determine the homogeneity of the group.

3. What were the policy sensitive factors that can be targeted in order to prevent food insecurity and to support food insecure households?

   Using data from the NPHS, multivariate analyses (weighted logistic regressions) were done to estimate the contributions of potential explanatory factors to the different levels of food insecurity. The regression models and the coding of the explanatory factors are described in sections 2.3.1 and 2.3.2.

4. What were the main food acquisition problems faced by food insecure households and what were the coping strategies they used?

   To better understand the experience of food insecurity, weighted cross-tabulations were prepared using data from the FIS, to determine the main problems faced by food insecure households in acquiring food and the income-management and food-management-strategies they used to cope with their food insecurity. To describe behaviour under conditions of food insecurity, data on coping strategies were estimated.

5. How many children lived in households that have experienced an episode of food insecurity?

[2] Note that statistical differences with reference categories are not presented.

Children less than sixteen years[3] old were asked specific questions in the FIS about how the child was affected by food insecurity in their household. Weighted frequencies of children who experienced an episode of food insecurity and the periodicity of such episodes were calculated and compared with data from the National Longitudinal Survey of Children and Youth (NLSCY). Though not directly comparable, the NLSCY included a question on child hunger.

2.3.1 Estimation strategy

In order to identify the independent factors that increased the likelihood of being a food insecure household i, the basic reduced-form model is written as follows:

$$\Pr ob(y_i = 1,0) = \alpha + \beta * I_i + \varphi * H_i + \delta * D_i + \omega * G_i + \varepsilon_i \qquad (1)$$

The vector y represented the dependant variable and equals 1 if the household was food insecure and 0 if it was not. I, H and D were vectors of explanatory variables where I was the vector of household income that allows the purchase of food as well as market goods and services, H was the vector of health characteristics (restriction of activity, etc.) that may be a barrier to food access and D was the vector of demographic characteristics (ethnicity/race, household type, etc.) reflecting differences and constraints among respondents and households in their acquisition of food. Finally, a vector of geographic characteristics (provinces, etc.) G, was also included to account for different food distribution systems or differences in access to food. The parameters $\alpha, \beta, \varphi, \delta$ and ω were estimated using the logistic regression model and the vector ε, the error term.

The relationship between main sources of income and the experience of food insecurity was studied by a second logistic regression adding dummy variables to the reduced form model (1) above for households who had welfare, retirement and other sources as their main source of income.

A key objective was to verify if any of these explanatory variables were associated with higher levels of food insecurity. The same reduced-form model as equation (1) was used for a multinomial logistic regression analysis. The three-category dependent variable of this equation represented levels of food insecurity, where y equals 0 if household is food secure, 1 if *food*

[3] A proxy interview was conducted for selected children less than sixteen years old.

anxious or if *compromised diet* and 2 if *food poor*. Since their characteristics were similar and since statistical power of estimation would be increased, those that were *food anxious* and those that had a *compromised diet* were combined.[4] The analyses were based on a sample of 16,568 respondents[5] in the NPHS. Fifteen respondents who did not answer the three screening questions were excluded as well as 204 respondents with other missing characteristics.

2.3.2 Coding of the explanatory factors

The explanatory factors in the vectors of the equation were coded in the following manner (Table 2.1).

Table 2.1 **List of the explanatory factors included in the regression models**

Explanatory factors	Type of variable
Lowest third of standardized total household income (<= $16,115)	Dichotomous
Middle third of standardized total household income ($16,115 to $29,240)	Dichotomous
Missing standardized total household income	Dichotomous
Main source of income was social assistance or welfare	Dichotomous
Main source of income was either pension plans, retirement pensions, old age security and G.I.S.	Dichotomous
Main source of household income was employment insurance, worker's compensation, child tax benefit, child support, alimony and other.	Dichotomous
Couple with at least one child less than 13 years old	Dichotomous
Couple with children only between 13 and 25 years old	Dichotomous
Lone parent family with at least one child less than 13 years old	Dichotomous
Lone parent family with only children between 13 and 25 years old	Dichotomous
Unattached respondent	Dichotomous
Dwelling owned by a household member	Dichotomous
Respondent had a restriction of activity	Dichotomous
Respondent had a chronic condition diagnosed by a health professional	Dichotomous
Respondent had been an immigrant for less than 10 years	Dichotomous
Respondent had been an immigrant for more than 9 years	Dichotomous

[4] It is recognized that conceptually the compromised diet level may be more closely related to the food poor level.

[5] Respondents with missing data on household income were retained by identifying them in the multivariate analysis with a dummy variable. The same regressions were run including and excluding these respondents and the findings did not change. Their inclusion adds additional statistical power with minimum risk of selection bias. Normalized weights were used. Normalized weight = Survey weight/mean (Survey weight).

Table 2.1 (continued)

Explanatory factors	Type of variable
Respondent was an aboriginal (off-reserve)	Dichotomous
Province of residence: Newfoundland	Dichotomous
Province of residence: Prince Edward Island	Dichotomous
Province of residence: Nova Scotia	Dichotomous
Province of residence: New Brunswick	Dichotomous
Province of residence: Quebec	Dichotomous
Province of residence: Manitoba	Dichotomous
Province of residence: Saskatchewan	Dichotomous
Province of residence: Alberta	Dichotomous
Province of residence: Bristish Columbia	Dichotomous
Household lived in a rural area	Dichotomous

3. Results

3.1 Food insecurity in Canada

In 1998, approximately 3,000,000 respondents, approximately 10.2 per cent of the population in Canada, lived in a household that stated that an episode of food insecurity was experienced in the past year (Table 3.1). The proportion of respondents who were children was higher (13.4%) than respondents who were adults (9.3%). Most of these food insecure households were food anxious (8%) or compromised their diet (7.8%). About 4.0 per cent of Canadians, or 1,200,000, experienced an episode in the last year when they or someone in their household did not have enough food to eat because of a lack of money.

Table 3.1 **Numbers and proportions of Canadian population living in food-secure and food-insecure households, 1998-1999**

Category, *n (%)* *(numbers in thousands)**	Food secure	Food insecure				Total
		Total	Anxious	Compromised diet	Food poor	
Total Canadian population	26,458	3,015	2,360	2,290	1,211	29,473
	(89.8)	(10.2)	(8.0)	(7.8)	(4.1)	
Adults	20,470	2,098	1,655	1,612	873	22,560
	(90.7)	(9.3)	(7.3)	(7.2)	(3.9)	
Children (0-17)	5,988	924	705	678	338	6,912
	(86.6)	(13.4)	(10.2)	(9.8)	(4.9)	

* Survey weight was used for national numbers.

Note: The categories of food insecurity in Table 3.1 are not mutually exclusive. Most of the time, the food poor were also anxious and/or had compromised diet.

Source: NPHS, cycle 3

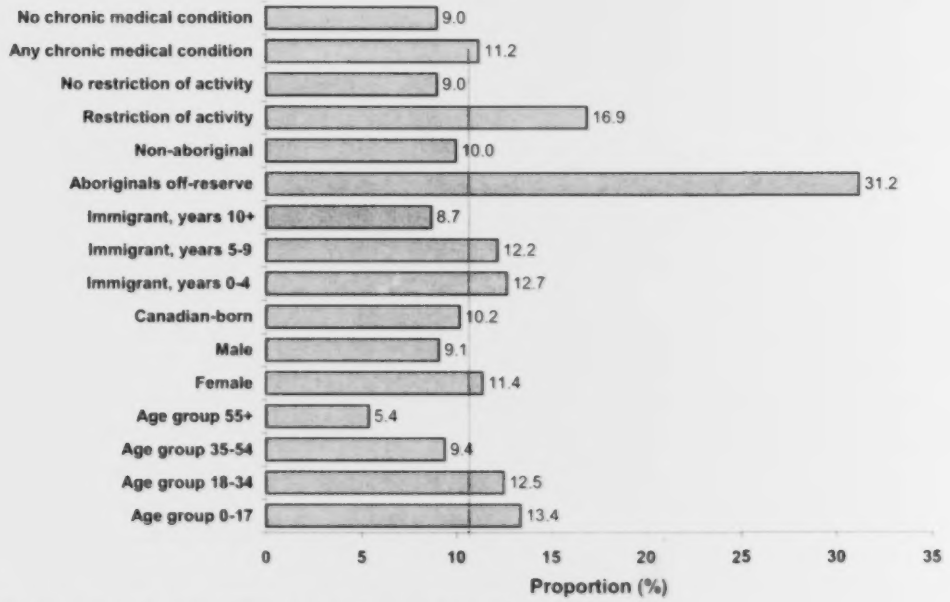
Figures 3.1 to 3.3 show the demographic, health, household and geographic characteristics of food insecure households.

3.1.1 Demographic and health characteristics of the respondents

Food insecurity was not only more prevalent among children, as seen in Table 3.1, but also among young adults (12.5% for respondents aged 18-34 years). The proportion of food insecurity was lower among Canadians aged 54 years and over (5.4%). The proportion of food insecure women (11.4%) and recent immigrants (12.7% and 12.2%) was slightly higher than the proportion of all Canadians (10.2%) but a large proportion, one third, of aboriginal households

off-reserve lacked food security. The proportion of food insecurity among respondents with a restriction of activity (16.9%) or a chronic medical condition (11.2%), was also higher than the national proportion.

Figure 3.1 **Proportion of food insecure households, by demographic and health characteristics of the respondents, Canada, 1998-1999**



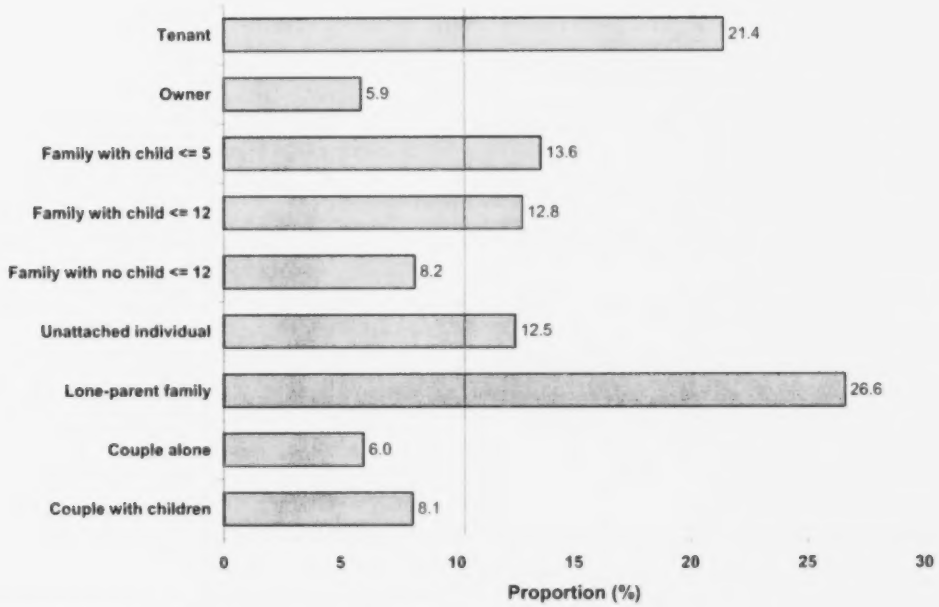
Note: The vertical line indicates that the proportion in Canada was 10.2%.

Source: NPHS, 1998-1999

3.1.2 Characteristics of the household

Food insecurity was higher for families having at least one child less than five or twelve years old (13.6% and 12.8%) than for all Canadians due to the high proportion of food insecurity among lone-parent families (26.6%). The proportion of food insecure households was smaller among couples without children (6.0%) than with children (8.1%) and among households where a member owned the dwelling (5.9%). On the other hand, 12.5% of unattached individuals were food insecure as were 21.4% of tenants.

Figure 3.2 **Proportion of food insecure households, by household characteristics, Canada, 1998-1999**



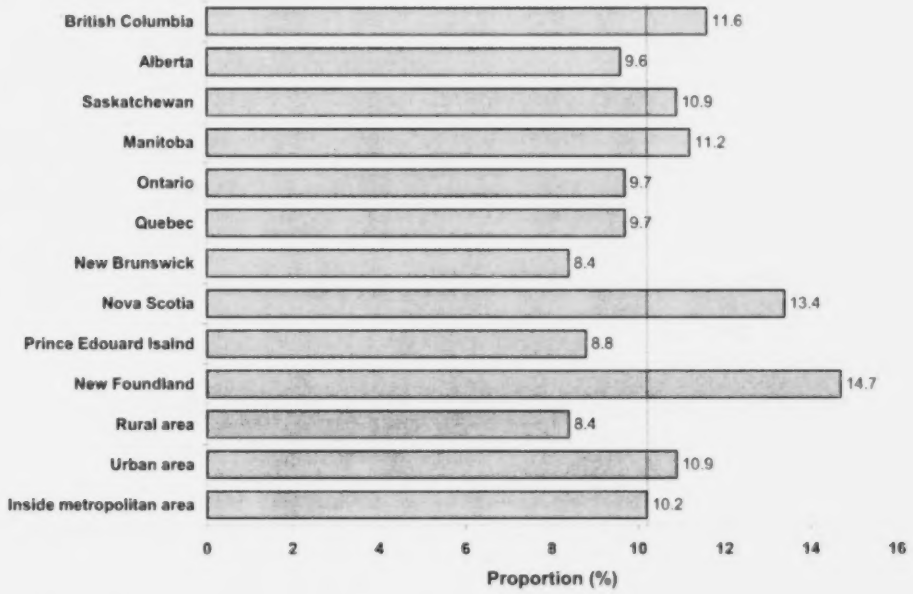
Note: The vertical line indicates that the proportion in Canada was 10.2%.
Source: NPHS, 1998-1999

3.1.3 Geographic characteristics

Newfoundland (14.7%) and Nova Scotia (13.4%) showed the largest deviation from the national proportion (10.2%) of food insecure households. New Brunswick (8.4%) and Prince-Edward-Island (8.8%) had a lower percentage than the national figure. The proportions of food insecure households in the two most populous provinces, Ontario and Quebec, were very similar to the national percentage. Also, the proportion of food insecure households in rural areas (8.4%) was slightly smaller than in metropolitan (10.2%) areas and in urban[6] areas (10.9%).

[6] Living in an urban area is defined as living *not* in neither a rural nor a metropolitan area.

Figure 3.3 **Proportion of food insecure households, by geographic characteristics, Canada, 1998-1999**



Note: The vertical line indicates that the proportion in Canada was 10.2%.
Source: NPHS, 1998-1999

3.1.4 Total household income

As expected, Table 3.2 shows that the proportion of food insecure households was higher in the lowest third of standardized household income (24.6%) than in the middle third (6.7%) or in the highest third (1.9%). The proportion was even higher for poor households (34%). More than half (56.9%) of households with social assistance as their main source of income lacked food security. A significant proportion (8.2%) of households for whom earnings was their main source of income was food insecure, suggesting that they were the working poor (numbers not presented). However, the proportion of food insecure households for whom senior's benefits (6%) was the main source of income, was lower than the national rate 10.2%. Overall, in term of absolute numbers, close to 61% of the food insecure households were the "working poor," 24% were on welfare, 8% had senior's benefits and the remaining 7% relied on other sources.

Since the screening questions on food insecurity in NPHS were linked to a lack of money, the distribution of standardized household income associated with levels of food insecurity were examined. Figure 3.4 shows that, while the difference in standardized family income was sizeable between those who were food secure and those that were not, differences in family income between the levels of food insecurity were present but not great. Eighty per cent of food

insecure households had a standardized income of $20,000 or less before taxes and deductions and 50 per cent had a standardized income of $11,000 or less.

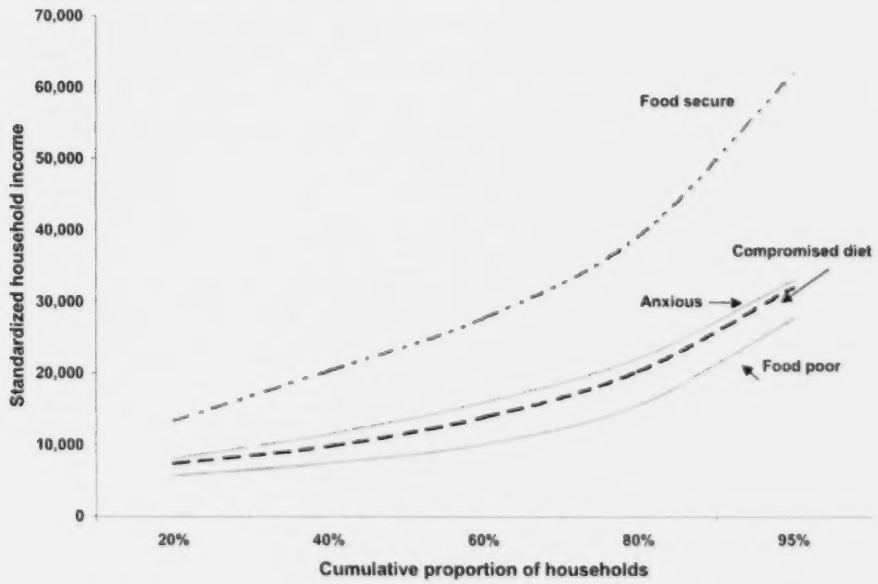
Table 3.2 **Household income of food secure and food-insecure households in Canada, 1998-99**

	Estimated population (in thousands)	Proportion (%) of food insecure households
Thirds[1] of standardized household income		
< $18,064	7,942	24.6
$18,064 - $31,897	7,878	6.7
> $31,897	8,245	1.9
Missing information	5,407	7.0
Poor household[2]	2,017	34.0
Main source of household income		
Wages and salaries/dividends and interest	19,798	8.2
Self-employment	3,142	6.6
EI/Worker's compensation/Child Tax Benefit/Child support/Alimony/None	550	26.2
Social assistance/welfare	1,262	56.9
CPP, QPP, OAG, GIS	4,055	6.0
Other	370	19.0

1. Total household income was adjusted for the number of persons in the economic family. The standardized household income was: (total household income/square root of the no. of persons in the economic family).
2. An household was poor if the total household income was less than $11,924 which was 50% of the median of the standardized household income. This measure of poverty was used in the Luxembourg Income study (LIS) (Atkinson et al. 1995) and was applicable only to non-missing data.

Note: The numbers and the percentages were weighted.
Source: NPHS, 1998-1999

Figure 3.4 **Levels of food security by household income in Canada, 1998-99**



Source: NPHS, 1998-1999

3.2 Factors affecting food insecurity

3.2.1 Results of logistic regressions

The likelihood of being food insecure was determined by a regression analyses using the potential explanatory variables, as described previously in section 2.3. Table 3.3 presents the frequencies of those explanatory variables and the estimated log-odds ratios (OR) of those logistic regressions. The estimated adjusted OR indicated, as expected, that households were more likely to be food insecure if their standardized income was in the lowest third of the range (OR=10.2) or the middle third (OR=3.07), compared to the highest third. Living in a family with children also increased the relative odds of being food insecure, especially for lone-parent families. Lone-parent families with a child less than thirteen years old were four times (OR=4.28) more at risk than couples with no children. The same positive associations were found for lone-parents with children aged 13 to 25 years (OR=2.79), couples with a child less than thirteen years old (OR=1.99) and couples with children aged 13 to 25 years (OR=1.46). Tests[7] showed that the difference in estimates for family types (lone-parent families with children under 13 and 13-25 years and couples with children) were statistically significant. The odds of being food insecure were slightly higher for families with younger children (under 13).

Also, exposure to food insecurity was significantly higher for respondents with a restriction of activity (OR=1.86), a chronic medical condition (OR=1.13) and for Aboriginal respondents (OR=1.95).[8] Living in a dwelling owned by a member of the household was a strong protective factor, where their risk was only 39 per cent of the risk associated with renters. The odds ratios for unattached individuals and immigrants who have lived in Canada for less or more than 10 years were not significant. Finally, the odds ratio for households living in a rural area was not statistically significant in the adjusted model.

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7 Test (1): coupch12 – coupch25 = 0, $\chi^2 = 9.66$, Prob > $\chi^2 = 0.0019$. Test (2): lonep12 – lonep25 = 0, $\chi^2 = 9.99$, Prob > $\chi^2 = 0.0016$.

8 This adjusted odds ratio should be interpreted with caution because there were few Aboriginal respondents in the sample.

Table 3.3 **Adjusted odds ratios of factors related to food insecurity**

Explanatory factor	16,568 unweighted[3] respondents			
	Adjusted[1] odds ratio	95% C.I.	Adjusted[1,2] odds ratio	95% C.I.
Standardized household income				
Lowest third	10.20*	8.01 – 12.98	11.19*	8.72 – 14.35
Middle third	3.07*	2.37 – 3.98	3.45*	2.66 – 4.47
Missing income	3.76*	2.88 – 4.91	4.14*	3.16 – 5.42
Highest third (reference)	1.00	–	1.00	–
Main source of income				
Welfare	–	–	3.06*	2.54 – 3.68
Retirement	–	–	0.35*	0.29 – 0.42
Other source	–	–	1.41*	1.12 – 1.78
Earnings (reference)	–	–	1.00	1.00
Household type				
Couple with child < 13	1.99*	1.66 – 2.38	1.35*	1.11 – 1.63
Couple with child 13-25	1.46*	1.17 – 1.82	1.03	0.81 – 1.29
Lone parent with child < 13	4.28*	3.45 – 5.31	2.25*	1.79 – 2.83
Lone parent with child 13-25	2.79*	2.19 – 3.54	1.95*	1.51 – 2.50
Unattached	1.14	0.95 – 1.38	1.09	0.90 – 1.32
Couple alone (reference)	1.00	–	1.00	–
Home ownership				
Yes	0.39*	0.35 – 0.44	0.50*	0.44 – 0.56
No (reference)	1.00	–	1.00	–
Restriction of activity				
Yes	1.86*	1.63 – 2.12	1.94*	1.69 – 2.24
No (reference)	1.00	–	1.00	–
Chronic condition				
Yes	1.13*	1.00 – 1.28	1.24*	1.09 – 1.40
No (reference)	1.00	–	1.00	–
Year since Immigration				
0-9 years	0.77	0.59 – 1.28	0.67*	0.51 – 0.88
10 years and move	0.89	0.73 – 1.08	0.96	0.78 – 1.17
Not immigrant (reference)	1.00	–	1.00	–
Aboriginal person				
Yes	1.95*	1.42 – 2.68	1.60*	1.15 – 2.22
No (reference)	1.00	–	1.00	–
Rural area				
Yes	0.92	0.80 – 1.06	0.90	0.78 – 1.04
No (reference)	1.00	–	1.00	–

* 95% Statistically significant

1 The odds ratios were adjusted for all variables in the tables and all provinces.

2 Dummy variables for main source of income were added to the specification.

3 The estimated odds ratios from this unweighted logistic regression were very similar to the ones from the weighted (Bootstrap weights) logistic regression of Che and Chen (2001).

What was the impact of the main source of household income? Compared to households with earnings,[9] households with welfare (social assistance) as the main income source were three times (OR=3.06) more likely to be food insecure while a household with senior's benefits as the main income source (OR=0.35) had decreased odds of being food insecure. The other main

9 Earnings include wages/salaries, dividends or self-employment as main source of income.

sources of income (OR=1.41) increased the odds of being food insecure. These findings[10] suggest that the experience of food insecurity for households differs with the main source of income. To establish if households with the lowest third of household income had increased odds of being food insecure, regardless of the main source of income, separate[11] logistic regressions were computed, using the same specification with first, only households with earnings as the main income source of income and second, only households with senior's benefits as the main income source. This strategy (see Table B1, appendix B) confirmed that households with the lowest third of household income had increased odds of being food insecure, regardless of the main source of income.

3.2.2 Results of multinomial logistic regression

A multinomial logistic regression was used to verify if the relative odds of the explanatory variables increased with the severity of food insecurity. The results appear in Table B2 (appendix B). After estimating the odd ratios, the statistical difference in the estimates of regression (1) and (2) for each explanatory variable was tested[12]. Having income in the lowest third and owning a home were the two factors[13] that significantly increased the odds of being food poor. For example, the households with income in the lowest third are five times ($OR_2 - OR_1$) more likely to be food poor than being anxious and/or having a compromised diet, and 13.3 times more likely of being food poor than being food secure. Furthermore, the increased odds of risk related to variables such as income in the middle third, couples with children, lone parents, restriction of activity and Aboriginal respondents living off-reserve remain significant but they do not vary with the severity of food insecurity.

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10 Estimated OR from this regression should be interpreted with prudence. There is a potentially high multicolinearity between thirds of household income, main source of income and home ownership. The strategy of running separate regressions for different main sources of income might be more appropriate.

11 Though the validity of separate regressions was not tested, the strategy was reasonable. It is possible that households with pensions as the main source of household income might have different food security experiences than households with earnings or welfare as the main source of income. Note that households with welfare as the main source of income were all in the lowest third so it was not useful to run a separate logistic regression for that group alone. The estimated adjusted odds ratios are presented in Table B1 (Appendix B).

12 See the test results in Table B3 (Appendix B).

13 The odds ratio of being food poor increased for aboriginal persons but because of small numbers of aboriginal respondents in the sample, this odds ratio should be used with caution.

3.3 Problems with food acquisition

The pathways to food insecurity were diverse and complex but primarily, individuals afflicted by food insecurity face two interrelated problems: lack of money and food acquisition. The FIS provided data on the difficulties faced by households when acquiring enough food.

Table 3.4 lists the frequencies of food insecure households experiencing different problems[14] related to food acquisition. From the highest percentage to the lowest, the problems were: no money for transport (21%), health problem (15%), transport not available (12%), long-term disability (11%) and stores too far away (8%). Twenty-two per cent of food insecure households reported other (unstated) food acquisition problems. For every problem of food acquisition, the percentage of households increased with the severity of the food insecurity, showing that each one is a contributer. Persons with poor health or disability seem particularly vulnerable to problems acquiring food.

Table 3.4 **Food acquisition problems of food-insecure households, Canada, 1998-99**

Problem	Thousands of food-insecure households (n=3,015)			
	Anxious (n=548)	Compromised diet (n=1,303)	Food poor (n=1,164)	Total
	Numbers and proportion (%) of food-insecure households			
No money for transport	68 (12)	262 (20)	317 (27)	647 (21)
Health problem	52 (10)	184 (14)	221 (19)	457 (15)
Transport not available	40 (7)	156 (12)	179 (15)	375 (12)
Long-term disability	34 (6)	140 (11)	172 (15)	346 (11)
Stores too far away	28 (5)	122 (9)	93 (8)	243 (8)
Other	67 (12)	286 (22)	314 (27)	667 (22)

Notes:
1 The three food insecurity groups were mutually exclusive in this analysis.
2 Percentages applied to the respondent or anyone in the household.
3 Numbers and percentages in brackets were weighted.
Source: NPHS - Food Insecurity Supplement 1998-99

3.4 Coping strategies

It has been noted earlier that the behaviour of household members was affected by the experience of insecurity. Actions were taken when faced with events that lead to compromises in food security directed to limiting the experience and managing recovery. Such coping behaviour may include actions to acquire food that deviate from social norms or unusual steps to acquire

[14] Did the respondent or anyone in the household face the following problems when acquiring food: stores too far away, transport not available, no money for transport, long-term disability, health problem or other.

money for food. The FIS collected data on some coping strategies[15] used by households. Those strategies can be categorized into either management of income or management of food.[16]

Table 3.5 **Proportion (%) of coping strategies used by households at risk in Canada, 1998-99**

	Households at risk					All food insecure households
	Lowest third < $16,115	Lone parent	Tenant	Restriction of activity	Aborignal off-reserve	
Income management						
Used coupons/bottles	61	67	59	62	63	57
Delayed paying bills	53	61	54	49	77	49
Borrowed money	45	54	47	39	59	40
Borrowed food	23	30	24	21	26	20
Sold possessions	15	18	15	19	28	14
Bought food on credit	10	10	9	8	10	9
Food management (for respondents who answered "often" or "sometimes")						
Received food from charity	29	37	30	23	38	22
Ate cheaper foods	48	47	51	60	52	46
Skipped meals or ate less	31	30	37	44	37	28

Note: Percentages are weighted.
Source: NPHS - Food Insecurity Supplement 1998-99

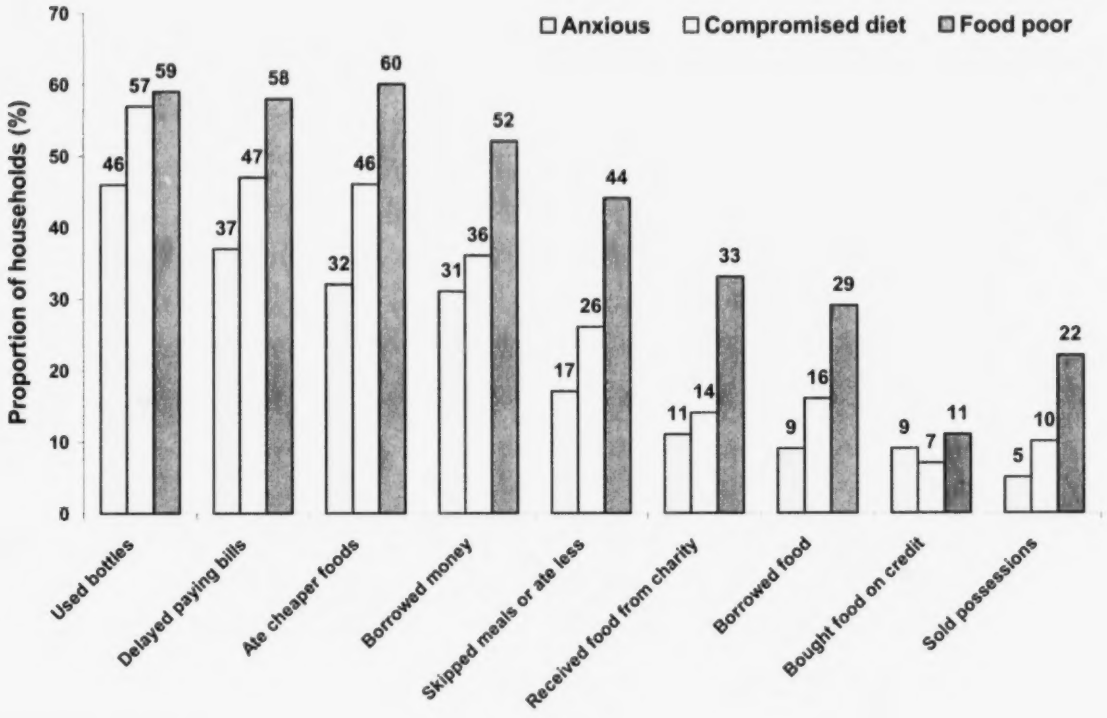
The predominant coping behaviours were directed to make income go further. As seen in Table 3.5, more than half (57%) of the food insecure households used coupons and/or returned bottles, 49 per cent delayed paying their bills, 40 per cent borrowed money, 20 per cent borrowed food, 14 per cent sold possessions and 9 per cent bought food on credit. Secondly, food insecure households chose more often to compromise their nutrition by eating cheaper foods (46%) and skipping meals or eating less (28%), rather than receive food from charity (22%). Such food management strategies were used more "sometimes" rather than "often" but when they were used, it was frequently (more than 50%) at the end of the month[17]. Thirdly, the strategies that require initiative and collaboration such as joining a community kitchen, food buying club and gardening were less used than food from charity. Overall, 83 per cent of the food insecure households used at least one of the coping strategies. A last but important finding is that the use of strategies increased with the level of food insecurity (see Figure 3.5) indicating that one strategy alone was rarely sufficient.

15 Tarasuk (2001) gives an excellent definition of "coping strategies," also called "resource augmentation."

16 The categorization is based on the research framework for the lack of food security (Brink, 2001).

17 See Table A1 in Appendix A.

Figure 3.5 **Coping strategies by level of food insecurity in Canada, 1998-99**



Source: FIS, 1998-1999

Table 3.5 displays the pattern of coping strategies used by households in the lowest third of income, lone-parent families, respondents with a restriction of activity, tenants and Aboriginal people living off-reserve. As expected, these households at risk[18] used more of every coping strategy than the average food insecure household. Lone-parent families and Aboriginal people off-reserve were living in households with the highest use of each income management strategy. The respondents with a restriction of activity received less food from charity than the other groups at risk but they compromised their diet a lot more (ate cheaper food, skipped meals). This suggests that households with restricted activity might use food management strategies because they may not be mobile enough to engage in other coping mechanisms.

18 "At risk" describes categories of households with higher probability of being food-insecure than other households.

3.5 Food insecurity among children

The FIS asked food insecure respondents[19] aged sixteen years or less, approximately 850,000 children, specific questions about food insecurity and food management strategies. Ten[20] per cent of children used school meal programs, a fifth of children had seen their diet compromised (22% ate unbalanced meals and 21% ate meals of reduced size), and very few families (3%) reported that the child missed meals. These food management strategies were used often at the end of the month. Eight per cent of children aged less than sixteen years old living in food insecure households had experienced hunger in the past year, which represented approximately 1.2 per cent of children aged less than sixteen years old in the canadian population[21]. This number is similar to the 1.5 per cent of children less than sixteen years old who experienced hunger due to poverty in 1998-1999 in the National Longitudinal Survey on Children and Youth (NLSCY)[22] with a representative sample of Canadian children. However there were high doubts about the validity of this comparison because of the small number of children[23] who responded to these specific questions in the FIS.

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19 An adult in the household answered the questions for children aged less than sixteen years old.

20 See Table A2 in Appendix A.

21 Using the NPHS, 13.8 per cent of canadian children aged less than sixteen years old were food insecure. Eight per cent of the 13.8 gives an estimated 1.2 per cent.

22 22,005 children sixteen years or under were surveyed in cycle 3 of the NLSCY. Result provided by HRDC. See also McIntyre (1998) for food-insecurity among children.

23 296 children, representing approximately 850,000 children in Canada. According to guidelines of Statistics Canada, extra caution is recommended in using these results because of the high sampling variability associated with all estimates, or percentages, presented in this section 3.5. In fact, most of the coefficients of variation of these estimates were between 16.6% and 33.3%.

4. Discussion

4.1 The prevalence of food insecurity in Canada

Though Canada is one of the "food rich" countries, one in ten Canadians were food insecure because of lack of money in the last year. Eight per cent were anxious about not having enough food to eat and 7.8 per cent did not eat the quality or quantity of food they wanted. Moreover, four per cent of Canadians (1,200,000) experienced an episode of food poverty in the past year, an unconscionable number exposed to this state of extreme deprivation. This percentage of food poor Canadians was very similar to the 4.5 per cent who "did not always have enough food to eat" in the NPHS of 1996-1997. In addition to confirming the number of Canadians affected, it suggests that there has not been a real decline. It should also be noted that this estimate of food insecurity may underestimate the real extent of the problem. Those who are food insecure may not be able to afford telephones, may be homeless or may experience other forms of disadvantage that precluded them from being involved in this survey.

The approximate numbers of young adults (870,000) and the numbers of children (920,000) exposed to a situation of food insecurity were also of concern. Lack of sufficient food, even temporarily, can have long term effects on pregnant or lactating mothers as well as on the development of children. Children and young adults may experience nutrition, learning or behaviour problems which may lead to lower income earning potential and social exclusion later in life. The effect on the productivity of adults has also been documented (Tarasuk, 2001).

Food insecure households were not homogeneous. The proportion of food insecure households was very high among households in the lowest third of income, very-low income households, households with welfare/social assistance as their main source of income, tenants, lone-parent families, aboriginal people off-reserve and Canadians with a restriction of activity. The proportion was also slightly higher than the national proportion for young canadians, young families, recent immigrants, women, households living in Newfoundland and Nova Scotia, and Canadians with a chronic medical condition. The food insecurity problems of these different groups were likely to involve other problems as well as their lower level of household income.

For instance, women had lower income than men and the proportion of low-income was higher in Newfoundland[24].

4.1.1 Cyclical experience

For some households, food insecurity was an unpleasant episode in the past year. But for more than fifty per cent of food insecure households, the stress is repeated at the end of the month when they engaged in coping strategies such as use of charity and the reduction of their food intake. Not only was their experience cyclical but they were likely to increase hardship, because many of the strategies (borrowing, delayed bills, pay on credit, etc.) increased their budget constraints in the following month. In terms of numbers of food insecure households, the majority of them were the "working poor." It is unlikely that they earn enough to have sufficient margin to save or to weather any emergencies occurring at the end of the month. Thus, these households face a "slippery slope".

4.1.2 Coping strategies

Most families cope with their lack of money to buy food by relying on income management and food management strategies. They returned bottles and used coupons more than any other strategy. As mentioned earlier, they preferred to delay paying bills, to borrow money and to compromise their diet rather than use charitable food sources such as food banks or collective kitchens. However, this statistic of food bank usage might underestimate the true situation because not all individuals who were food insecure use such charitable sources (Tarasuk, 2001).

4.2 Implications for policy

According to the analyses, the factors that increased the likelihood of being food insecure in Canada were low-income households, young families (especially lone-parents), aboriginal people off-reserve, Canadians with a restriction of activity and tenants. Although there is little research on the determinants of food insecurity at the national level in Canada, U.S. or even the U.K. (Tarasuk, 2001), the results confirm findings from past studies: Che and Chen (2001), Andrews et al. (1999), Castner (2000), Mauldon (1996), Olson et al. (1996). Any valid public policy aiming to prevent food insecurity should target these groups. It is likely that these groups

[24] The comparisons were drawn from the 2000 Statistics Canada report *Income in Canada 1998*.

have a combination of problems and that policies to address those that are food insecure should also address the other issues.

Though low income is the strongest factor associated with the experience of food insecurity, the problem was not only among those relying on income support programs as the main source of revenue (such as provincial social assistance, old age security, etc.). In fact, at the lowest third of household income, the main source was irrelevant.

Since high fixed payments (rent, hydro and telephone) are due at the beginning of the month, money disposable for food consumption is reduced particularly at the end of the month. In general, the food insecure households did not have sufficient economic resources[25] to manage fluctuating or unexpected needs. A full 75 per cent of the food insecure households had a standardized income of less than $19,000.[26] The depth of poverty and the difficulties at the end of the month suggest that income assistance paid out twice a month may help. Since most of the low-income households were the working poor, earned income supplements and tax rebates may not be high enough and paid out frequently enough to be helpful.

Public policy to support food insecure households is scarce. Support has largely been provided by the voluntary or charitable sector. Because households were more likely to compromise their diet than to use charitable sources, a system of emergency income support should tide households over and allow them to use mainstream sources of food rather than direct them to charity. With the numbers of young children potentially involved and since close to 70 per cent of food insecure households were families, support for food insecure young households should be a priority. The National Child Benefit should improve the situation of low-income families given that they will receive approximately $2,400 per child.

The larger policy question is the degree to which income transfers allow individuals and families to maintain a socially acceptable standard of living, while still having to rely on food consumption in the market. Since only a minimum is guaranteed, the margin of manoeuvre offered is a key issue. Furthermore, while countries like the United States have food aid, such as food stamps, Canada, at least at the Federal level, does not offer food assistance.

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25 However, their assets and debts are unknown.

26 Note that 50 per cent of food insecure households had income less than $23,000.

4.3 Limitations

Since one respondent answered questions related to food insecurity on behalf of all members in the households, it is not clear that the responses are accurate for all other household members. Information on work history, income, sources of income, and disposable income are necessary to inform policy on food insecurity. However, at low incomes, it is not only the relation between the income and expenditure, but also the pattern of inflows and outflows within the month or year. Information on those living under the low income cut-off or under conditions of deep poverty (50% of the low income cut-off) and the duration of such poverty may also be linked to the lack of food security. While data was available on income, the "real" amount of money disposable for food consumption and other expenditures was not known. In the multivariate analysis, a proxy strategy was used to estimate the budget constraint by using the household income, home ownership, household size, the type of household, health and geographic characteristics but it probably was not comprehensive enough. Some data on expenditures (mortgage, rent, annual expenses on electricity, water, etc.) were available in the FIS but the data were poor (large number of missing data) of no valid use. Furthermore, the use of the income management and food management strategies in Canada was probably underestimated because the questions were asked only for food insecure households.

5. Conclusion

Despite economic growth and a public safety net, one in ten Canadians still lacked food security, at least once in the past 12 months. Recent reductions in the social policy expenditures may have impacted these numbers. This form of insecurity, along with job insecurity and economic insecurity have both individual and societal effects. Food insecure households were heterogeneous and may require a variety of policy responses because of the links to other forms of disadvantage. Preventive policies should be directed to households that are at risk of being food insecure. Three quarters of the households that were food insecure had an annual standardized income of less than $19,000. Though food insecure households had low incomes, not all low income households were food insecure. Many food insecure households were dependant on income transfers but a majority had earnings as their main source of income. Targeted income supports to those without sufficient income may miss the large number of working poor who are food insecure. The amount of support and frequency of payments may also be examined since households do not have enough flexibility to cover unexpected draws on income. It may be necessary to have quickly available emergency financial support as well as more sustained type of support.

Three levels of food insecurity were examined. Ten per cent of households experience all levels of food insecurity but the numbers are concentrated among low-income households and families with young children. Four per cent of households were food poor – the most severe form of food insecurity, where they had experienced an episode when they did not have enough food to eat because of a lack of money in the past twelve months. The experience of food insecurity may be an isolated event for some but for many it is a recurrent one, frequently at the end of the month. These households engage in more coping strategies than households at the other two levels and preferred to make their income dollars go further rather than using charitable sources of food. A successful policy would provide quick emergency help without high transaction efforts or administrative restrictions, sufficient and frequent income support payments and support that allows households to use mainstream sources of food. It would also be important to include consistent questions on food insecurity on future surveys in order to monitor trends.

Appendix A

Tables of frequencies

Table A1 Periodicity of food management strategies in Canada, 1998-99

Strategy	Thousands food-insecure households (n=3,105)		
	Anxious (n=548)	Compromised diet (n=1,303)	Food poor (n=1,164)
	Numbers in thousands and proportion (%) of food-insecure households		
Received food from charity			
Often	1 (0.2)	17 (1)	77 (7)
Sometimes	59 (11)	167 (13)	333 (29)
N/A or don't know	488 (89)	1,118 (86)	754 (65)
At the end of the month*			
Yes	18 (3)	127 (10)	243 (21)
No	42 (8)	55 (4)	166 (15)
Ate cheaper foods			
Often	35 (6)	173 (13)	271 (23)
Sometimes	134 (24)	384 (30)	368 (32)
Never	191 (35)	374 (29)	228 (20)
N/A or don't know	189 (35)	371 (28)	297 (25)
At the end of the month*			
Yes	75 (14)	292 (22)	343 (30)
No	94 (16)	263 (21)	296 (25)
Skipped meals or ate less			
Often	13 (2)	98 (7)	172 (15)
Sometimes	65 (12)	227 (17)	276 (24)
Never	285 (52)	607 (47)	419 (36)
N/A or don't know	185 (34)	371 (29)	297 (26)
At the end of the month[1]			
Yes	34 (6)	187 (14)	248 (22)
No	43 (8)	136 (10)	200 (17)

* Numbers and percentages are only for the respondents who answered often or sometimes.

Note: Numbers and percentages were weighted.

Source: NPHS - Food Insecurity Supplement 1998-99

Table A2 **Food insecurity status and food management strategies of food-insecure children in Canada, 1998-99**

Food insecurity status	*Numbers in thousands and proportion (%) of children who were under 16 years old* **(n=853)**
Worried could not afford to feed child	
Often	111 (13)
Sometimes	264 (31)
Never	479 (56)
At the end of the month*	
Often	241 (28)
Sometimes	130 (16)
Child hungry	
Often	22 (3)
Sometimes	47 (5)
At the end of the month*	
Often	51 (6)
Sometimes	18 (2)
Child loss weight, n (%)	9 (1)
Food management strategy	
Used school meal program	85 (10)
Unable to give balanced meals to child	
Often	39 (5)
Sometimes	142 (17)
At the end of the month*	
Often	122 (15)
Sometimes	59 (7)
Reduced size of child's meals	
Often	31 (4)
Sometimes	148 (17)
At the end of the month*	
Often	108 (13)
Sometimes	71 (8)
Child missed meals	
Often	15 (2)
Sometimes	12 (1)
At the end of the month*	
Often	9 (1)
Sometimes	16 (2)

* Numbers and percentages in brackets are only for the respondents who answered often or sometimes.
Note : Numbers and percentages were weighted.
Source: NPHS - Food Insecurity Supplement 1998-99

Appendix B

Tables of statistical results

Table B1 **Adjusted odds ratios of factors related to food insecurity for households with earnings or senior's benefits as main source of income**

	Earnings (n=12,128)		Senior's benefits (n=3,148)	
Explanatory factor	**Adjusted* odds ratio**	**95% C.I.**	**Adjusted* odds ratio**	**95% C.I.**
Standardized household income				
Lowest third	11.52*	8.98 – 15.04	11.90*	2.90 – 48.89
Middle third	3.65*	2.82 – 4.79	2.49	0.54 – 11.37
Missing income	3.56*	2.68 – 4.78	5.15*	1.20 – 22.12
Highest third (reference)	1.00	–	1.00	–
Household type				
Couple with child < 13	1.29*	1.03 – 1.63	4.15*	1.54 – 11.20
Couple with child 13-25	1.04	0.79 – 1.37	2.13*	1.13 – 4.05
Lone parent with child < 13	2.40*	1.79 – 3.23	9.63*	3.28 – 28.22
Lone parent with child 13-25	1.55*	1.11 – 2.16	3.06*	1.69 – 5.52
Unattached	1.20	0.96 – 1.61	1.06	0.72 – 1.55
Couple alone (reference)	1.00	–	1.00	–
Home ownership				
Yes	0.48*	0.41 – 0.56	0.45*	0.31 – 0.64
No (reference)	1.00	–	1.00	–
Restriction of activity				
Yes	2.07*	1.72 – 2.48	2.43*	1.74 – 3.40
No (reference)	1.00	–	1.00	–
Chronic condition				
Yes	1.22*	1.06 – 1.41	0.81	0.51 – 1.29
No (reference)	1.00	–	1.00	–
Years since immigration				
0-9 years	0.63*	0.45 – 0.87	1.15	0.13 – 10.31
10 years and +	0.90	0.68 – 1.16	1.08	0.70 – 1.68
Not immigrant (reference)	1.00	–	1.00	–
Aboriginal person				
Yes	1.36	0.91 – 2.18	6.98*	2.20 – 22.14
No (reference)	1.00	–	1.00	–
Rural area				
Yes	0.80*	0.67 – 0.95	1.07	0.72 – 1.59
No	1.00	–	1.00	–

* Odds ratios were adjusted for all variables in the table and the provinces.

Table B2 **Crude and adjusted odds ratios of factors related to food insecurity, multinomial logistic regression**

Explanatory factor	Dependent Variable[1]	Crude[2] odds ratio	Adjusted[3] odds ratio	95% CI
Standardized household income				
Lowest third	(1)	11.49*	8.34*	6.42 – 10.82
	(2)	26.68*	13.57*	9.08 – 20.26
Middle third	(1)	3.43*	3.03	2.31 – 3.97
	(2)	3.37*	2.75*	1.77 – 4.26
Missing	(1)	3.07*	2.79*	2.07 – 3.75
	(2)	5.69*	4.55*	2.94 – 7.06
Household type				
Couple with child < 13	(1)	1.87*	2.10*	1.67 – 2.63
	(2)	1.50*	1.64*	1.22 – 2.20
Couple with child 13-25	(1)	1.13	1.60*	1.22 – 2.09
	(2)	0.69	1.08	0.73 – 1.59
Lone parent with child < 13	(1)	7.64*	3.76*	2.87 – 4.93
	(2)	12.53*	4.24*	3.10 – 5.79
Lone parent with child 13-25	(1)	3.57*	2.76*	2.06 – 3.70
	(2)	4.12*	2.63*	1.84 – 3.76
Unattached	(1)	1.76*	0.98	0.78 – 1.25
	(2)	2.70*	1.13	0.85 – 1.49
Home ownership	(1)	0.34*	0.49*	0.42 – 0.56
	(2)	0.15*	0.28*	0.23 – 0.34
Restriction of activity	(1)	1.70*	1.68*	1.40 - 2.01
	(2)	2.18*	1.95*	1.58 – 2.41
Chronic condition	(1)	1.11	1.15	0.99 – 1.34
	(2)	1.17*	1.06	0.88 – 1.28
Year since Immigration				
0-9 years	(1)	0.89	0.57*	0.40 – 0.82
				0.69 – 1.39
10 years and more	(2)	1.55*	0.97	0.59 – 0.98
	(1)	0.73*	0.76*	0.80 – 1.39
	(2)	0.98	1.05	
Aboriginal person	(1)	3.14*	1.47	0.98 – 2.21
	(2)	6.09*	2.48*	1.66 – 3.71

* 95% statistically significant

1 (1) indicates that the dependent variable equals 1 if anxious and/or nutrition insecure and 0 if food secure.
(2)indicates that the dependent variable equals 1 if food poor and 0 if food secure.

2 Crude odds ratio was the odds ratio of the variable compared to its reference without controlling for other variables

3 Odds ratios were adjusted for all the variables in the table, the provinces and rural area.

Table B3 **Test on the estimated odds ratios of the multinomial logistic regression**

For each explanatory factor, the following null hypothesis was tested **H0 : $OR_1 - OR_2 = 0$**

OR_1: Estimated OR where the dependent variable was 1 if anxious/compromised diet, 0 if food secure
OR_2: Estimated OR where the dependent variable was 1 if food poor, 0 if food secure

Explanatory factor	Test	χ^2	Prob > χ^2	Result
Lowest third	8.34 – 13.57 = 0	4.08	0.0433	Reject H0
Middle third	3.03 – 2.75 = 0	0.15	0.7013	Cannot reject H0
Missing income	2.79 – 4.55 = 0	3.38	0.0661	Cannot reject H0
Couple w child < 13	2.10 – 1.64 = 0	1.87	0.1710	Cannot reject H0
Couple w child 13-25	1.60 – 1.08 = 0	2.80	0.0941	Cannot reject H0
Lone-parent w child < 13	3.76 – 4.24 = 0	0.39	0.5328	Cannot reject H0
Lone-parent w child 13-25	2.76 – 2.63 = 0	0.05	0.8273	Cannot reject H0
Unattached	0.98 – 1.13 = 0	< 0.01	0.4511	Cannot reject H0
Home ownership	0.49 – 0.28 = 0	22.00	< 0.001	Reject H0
Restriction of activity	1.68 – 1.95 = 0	1.34	0.2468	Cannot reject H0
Chronic condition	1.15 – 1.06 = 0	0.55	0.4585	Cannot reject H0
Aboriginal person, off-reserve	1.47 – 2.48 = 0	4.44	0.0350	Reject H0
Immigrant, 0-9 years	0.57 – 0.97 = 0	4.65	0.0311	Reject H0
Immigrant, 10 years or more	0.76 – 1.05 = 0	3.27	0.0707	Cannot reject H0

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